Claims:

1. A method for molding an ophthalmic lens comprising:
(a) providing a first mold part having a front curve molding surface for the ophthalmic lens;
(b) providing a second mold part having a back curve molding surface for the ophthalmic lens;
(c) extruding a melt-processable polymer;
(d) cutting a sample from the extruded polymer;
(e) depositing the sample in the first mold part;
(f) moving the first and the second mold parts together to form a mold cavity between the opposing front curve molding surface and back curve molding surface with the polymer therebetween, the mold cavity defining a shape of an ophthalmic lens having a variable volume between a first volume and a second volume, the second volume being greater than the first volume, wherein the mold parts have sufficiently small clearance such that gas escapes from the mold cavity and none of the polymer escapes from the mold cavity;
(g) squeezing the mold parts together with a predetermined force; and
(h) allowing the polymer to solidify and form a lens.

2. A method for making an ophthalmic lens according to claim 1, further comprising:
(i) opening the mold;
(j) removing the lens from the mold.
(k) hydrating the ophthalmic lens; and
(l) packaging the ophthalmic lens.

3. A method for making an ophthalmic lens according to claim 2, wherein the melt-processable polymer has a glass transition temperature (T_g), a flow temperature (T_F), and a degradation temperature (T_D), wherein the sample has a volume between the first volume and the second volume.

4. The method for making an ophthalmic lens according to claim 3, wherein the extruded polymer is in the form of a wire and wherein the sample is in the form of a pellet having a length (L) and a diameter (D) in a L/D ratio of between 0.1 and 10.0.

5. The method for making an ophthalmic lens according to claim 4, wherein:
(1) the cutting comprises slicing the wire with a moving knife at an opening of an extrusion die through which the wire is extruded such that the pellet remains adjacent to the knife; and
(2) the depositing comprises moving the knife to a position proximate the first mold half, and pushing the pellet off the knife and into the first mold part.

6. The method for making an ophthalmic lens according to claim 5, wherein the pellet is supported by nesting the pellet in a groove or a set of tabs in the knife.

7. The method for making an ophthalmic lens according to claim 5, wherein the pellet is pushed off the knife with a means selected from the group consisting of an ejector pin, an air burst and a combination thereof.

8. The method for making an ophthalmic lens according to claim 5, wherein the knife is at a temperature between 120 °C below the T_g and T_D.

9. The method for making an ophthalmic lens according to claim 3, wherein the mold parts are independently at temperatures between 120 °C below the T_g and T_D of the polymer.

10. The method for making an ophthalmic lens according to claim 3, wherein the extruded polymer is in the form of a ribbon and wherein the sample is in the form of a disk having a thickness between 50 microns and 5 mm.

11. The method for making an ophthalmic lens according to claim 10, wherein:
(1) the cutting comprises moving the ribbon between a die and a punch, with the die below the ribbon and the punch above the ribbon; sliding a moveable core in the punch down against the ribbon and into the die opening, the moveable core having a diameter less than the diameter of the die opening, thereby punching a sample out of the ribbon; and
(2) the depositing comprises allowing the sample to drop through the die opening and into the first mold part.

12. The method for making an ophthalmic lens according to claim 11, wherein the cutting further comprises clamping the ribbon between the die and punch.

13. The method for making an ophthalmic lens according to claim 10, wherein the temperature of the ribbon is between 120 °C below the T_g of the polymer and T_D.

14. The method for making an ophthalmic lens according to claim 10, wherein the ribbon is extruded in an environment where the temperature of the air is maintained between 50 °C below the T_g of the polymer and 50 °C above T_F.

15. The method for making an ophthalmic lens according to claim 3, further comprising pumping the polymer from an extruder to an extrusion die with a melt pump.

16. The method for making an ophthalmic lens according to claim 15, wherein a closed-loop pressure feedback control system is coupled with the melt pump.

17. The method of molding an ophthalmic lens according to claim 3, wherein the melt-processable polymer is hydrophilic.

18. The method of molding an ophthalmic lens according to claim 3, wherein the melt-processable polymer forms a hydrogel when hydrated.

19. The method of molding an ophthalmic lens according to claim 3, wherein the polymer contains latent crosslinking groups, and wherein the temperature of the mold, the applied force, and the duration of the squeezing are sufficient to crosslink the polymer.

20. The method of molding an ophthalmic lens according to claim 19, wherein the temperature of the mold is greater than the temperature at which the polymer is extruded.

21. The method for molding an ophthalmic lens according to claim 3, wherein the sample volume is between 0.01% and 10% greater than the first volume.

22. The method for making an ophthalmic lens according to claim 3, further comprising a cyclic process, the cyclic process comprising: depositing a second sample of polymer in the mold; wherein the steps are repeated to mold a plurality of samples in the mold.

23. The method for making an ophthalmic lens according to claim 22, wherein the cyclic process further comprises ensuring the mold is empty and clean after removing the lens such that the second sample of polymer is deposited into an empty clean mold.

24. The method for making an ophthalmic lens according to claim 22, wherein the plurality of samples has an average volume with a standard deviation σ and wherein the average volume is between the first volume plus σ and the second volume minus σ.

25. A method for molding an ophthalmic lens according to claim 2, wherein the extruded polymer is in the form of a ribbon, wherein the sample has a third volume, wherein the melt-processable polymer has a glass transition temperature (T_g), a flow temperature (T_F), and a degradation temperature (T_D), wherein the mold cavity comprises an ophthalmic lens mold cavity and a flange mold cavity, the ophthalmic lens mold cavity having a fourth volume being less than the third volume, the flange mold cavity being located around the periphery of the ophthalmic lens mold cavity.

26. The method of molding an ophthalmic lens according to claim 25, wherein the sample is in the form of a disk having a thickness between 0.05 mm and 1.0 mm and/or a diameter greater than the diameter of the ophthalmic lens mold cavity.

27. The method for molding an ophthalmic lens according to claim 25, wherein the moving comprises clamping at least a portion of the sample in the periphery of the ophthalmic lens mold cavity.

28. The method for molding an ophthalmic lens according to claim 25, wherein the portion of the sample outside the ophthalmic lens mold cavity forms a flange in the flange mold cavity.

29. The method for molding an ophthalmic lens according to claim 28, further comprising removing the flange from the ophthalmic lens.

30. The method for molding an ophthalmic lens according to claim 25, wherein the mold parts are squeezed together and then opened in less than 500 seconds.

31. The method for molding an ophthalmic lens according to claim 25, wherein the mold parts are independently at temperatures between 120 °C below the T_g and T_D.

32. The method for molding an ophthalmic lens according to claim 2, wherein the step of allowing the polymer to solidify and form a lens comprises decreasing the temperature of the mold.

33. The method for molding an ophthalmic lens according to claim 32, wherein at least 90% of the predetermined force is equilibrated by the sample in the mold cavity to stop the mold parts from relative movement.

34. The method for molding an ophthalmic lens according to claim 2, wherein the step of removing the lens from the mold comprises: separating one of the two mold parts from the other mold part having the molded ophthalmic lens adhered thereto; pressing a flexible pad into frictional contact with the ophthalmic lens; applying a force to the lens by way of the flexible pad to move the flexible pad to separate the ophthalmic lens from the molding surface; and applying a vacuum to a suction port around the pad thereby picking up the lens.

35. A method for molding an ophthalmic lens comprising:
(a) providing an ophthalmic lens mold cavity;
(b) depositing an amount of a melt-processable polymer into the open mold cavity;
(c) closing the mold cavity with sufficient force so as to deform the polymer therein into an ophthalmic lens;
(d) opening the mold cavity; and
(e) removing the ophthalmic lens.

36. The method for molding an ophthalmic lens according to claim 35, wherein the lens incorporates all the polymer deposited into the cavity.

37. The method for molding an ophthalmic lens according to claim 35, wherein the mold cavity is closed for a period less than 500 seconds sufficient to allow the polymer to retain the shape of the mold cavity.

38. A method for molding an ophthalmic lens comprising:
(a) providing an ophthalmic lens mold cavity;
(b) depositing an amount of a reactive pre-polymer into the open mold cavity;
(c) maintaining the temperature of the mold cavity greater than 120 °C below the T_g of the pre-polymer deposited therein;
(d) closing the mold cavity so as to force out gas and shape the pre-polymer therein into an ophthalmic lens;
(e) maintaining the mold cavity in a closed position for a period less than 500 seconds sufficient to allow the pre-polymer to sufficiently react into a polymer that retains the shape of the mold cavity to form an ophthalmic lens;
(f) opening the mold cavity; and
(g) removing the ophthalmic lens.

39. The method for molding an ophthalmic lens according to claim 38, wherein the lens incorporates all the polymer deposited into the cavity.

40. A method for molding an ophthalmic lens comprising:
(a) providing a first mold part having a front curve molding surface for the ophthalmic lens;
(b) providing a second mold part having a back curve molding surface for the ophthalmic lens, the mold halves adapted to mate together to form a mold cavity in the shape of an ophthalmic lens having a variable volume at least between a first volume and a second volume, the second volume being greater than the first volume;
(c) providing a first reactive fluid component at a first temperature;
(d) providing a second reactive fluid component at a second temperature, said reactive components capable of forming a hydrophilic polymer;

(e) mixing the first and second feed components together at a third temperature capable of initiating a reaction between the components and for a residence time sufficient to convert the fluid components into a fluid pre-polymer material;
(f) dispensing a sample of the pre-polymer material into the first mold part, the sample having a volume between the first volume and the second volume, the first mold part having a fourth temperature;
(g) moving the mold parts together to form a mold cavity such that the back curve molding surface contacts the pre-polymer material, the back curve molding surface having a fifth temperature;
(h) squeezing the mold parts together with a predetermined force, wherein the mold parts have sufficiently small clearance such that gas escapes from the mold cavity, and none of the sample escapes from the mold cavity;
(i) maintaining the predetermined force on the moldable material for a period of time sufficient to convert the fluid pre-polymer material into a non-fluid hydrophilic polymer;
(j) opening the mold parts;
(k) removing the lens;
(l) hydrating the ophthalmic lens; and
(m) packaging the ophthalmic lens.

41. The method for molding an ophthalmic lens according to claim 40, wherein the fourth temperature and the fifth temperature are greater than the third temperature.

42. The method for molding an ophthalmic lens according to claim 40, wherein the mixing comprises introducing the reactive fluid components into a vessel having a dynamic mixer.

43. The method for molding an ophthalmic lens according to claim 42, wherein the vessel is capable of providing a plurality of samples of pre-polymer material in a way such that the residence time has an average value with a standard deviation σ.

44. The method for molding an ophthalmic lens according to claim 43, wherein the the vessel has a volume to provide an average residence time plus 3σ of the reactive components therein

which is substantially less than the time required for gelation of the reactive mixture at the first temperature.

45. The method for molding an ophthalmic lens according to claim 43, wherein the average residence time plus 3σ and the shaping time together are substantially less than the time required for gelation of the reactive mixture at the first temperature.

46. The method for molding an ophthalmic lens according to claim 40, wherein the first mold half is at a temperature between 1.0 °C and T_D, and the second mold half is at a temperature between 10 °C and T_D.

47. An apparatus for molding a polymer comprising:
(a) a first mold part having a first molding surface; and
(b) a second mold part having a second molding surface, the second molding surface capable of containing a sample of polymer, the sample having a volume;
the mold parts being adapted to mate together to form a mold cavity in the shape of an ophthalmic lens having a variable volume at least between a first volume and a second volume, the second volume being greater than the first volume;
wherein the mold parts have sufficiently small clearance such that gas escapes from the mold cavity, and none of a sample of material escapes from the mold cavity when the mated mold halves are subjected to a predetermined force with the sample in the mold cavity.